

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. *(Currently Amended)*: An information reproducing apparatus for performing maximum-likelihood decoding ~~by reading out information recorded on a recording medium,~~ comprising:

a detecting section which detects information recorded in the recording medium and which outputs a reproduction signal;

an equalizing section which performs partial response equalization of ~~a detection signal detected by the detecting section~~ the reproduction signal and which outputs an equalized signal;

a correcting section which corrects the potential of the equalized signal ~~output from the equalizing section~~ in accordance with a correction amount determined on the basis of a plurality of reference levels ~~that is used for the maximum-likelihood decoding,~~ to produce a corrected equalizing signal; and

a maximum-likelihood decoding section which performs maximum-likelihood decoding of the corrected equalizing signal by referencing the plurality of reference levels, ~~in accordance with the equalized signal corrected by the correcting section,~~ and which outputs a ~~decoding decoded~~ signal;

wherein, the plurality of reference levels used for the maximum-likelihood decoding are represented by LV(1), LV(2), ..., LV(n-1), and LV(n) in sequence from the lowest level, and a plurality of levels for peaks in a histogram of equalized signals and that correspond to the reference levels are represented by LP(1), LP(2), ..., LP(n-1), and LP(n) in sequence from the peak level whose value is smallest, the correction amount is determined by the correcting section to generate a value satisfying one of:

$$\text{LP}(1) = \text{LV}(1) - \alpha \text{ (where } \alpha \text{ is a constant), and}$$

$$\text{LP}(n) = \text{LV}(n) + \alpha, \text{ and}$$

wherein the constant α is the same as a value LVd equal to each of the intervals between the plurality of reference levels used for the maximum-likelihood decoding and,

based on the correction amount, the correcting section corrects a corresponding equalized signal level.

2. -3. (*Cancelled*).

4. (*Currently Amended*): An information reproducing apparatus according to claim 1, wherein the correction amount ~~to be determined by the correcting section~~ is a value determined such that at least one of the corrected values of the plurality of ~~peak levels for peaks in the~~ a histogram of the equalized signals that correspond to the reference levels and that are output from the equalizing section matches at least one of the values of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding.

5. (*Currently Amended*): An information reproducing apparatus according to claim 1, wherein the correction amount ~~to be determined by the correcting section~~ is a value determined such that at least one of the corrected values of the plurality of ~~peak levels for peaks in the~~ a histogram of the equalized signals that correspond to left and right reference levels adjacent to a central reference level used for the maximum-likelihood decoding matches at least one of the values of the left and right reference levels adjacent to the central reference level ~~of the plurality of reference levels that are used for the maximum-likelihood decoding.~~

6. (*Currently Amended*): An information reproducing apparatus according to claim 1, wherein when levels for peaks in a histogram of the equalized signals ~~has an asymmetric~~ have a distribution asymmetric including a fine portion and a coarse portion with respect to a ~~peak level corresponding to~~ a central reference level of the plurality of reference levels used for the maximum-likelihood decoding, such that the distribution has a fine portion and a coarse portion, the correction amount ~~to be determined by the correcting section~~ is a value determined such that, ~~in~~ of left and right reference levels adjacent to the central reference level of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding, a value of the reference level on the side where the distribution includes the fine portion matches a corrected value of a corresponding peak level ~~corresponding to the value of the reference level.~~

7. *(Currently Amended)*: An information reproducing apparatus according to claim 1, wherein the correction amount ~~to be determined by the correcting section~~ is a value determined such that at least one of reference levels provided at second left and right portions ~~from displacements from~~ a central reference level of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding matches at least one of the corrected values of a plurality of corresponding peak levels for peaks in a histogram of the equalized signals ~~corresponding to the reference levels provided at the second left and right portions from the central reference level.~~

8. *(Currently Amended)*: An information reproducing apparatus according to claim 1, wherein when levels for peaks in a histogram of the equalized signals ~~has an~~ have a distribution ~~asymmetric component distribution including a fine portion and a coarse portion~~ with respect to a peak level corresponding to a central reference level the reference levels, including a fine portion and a coarse portion, the correction amount ~~to be determined by the correcting section~~ is a value determined such that, in reference levels provided in second left and right portions of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding, a value of the reference level on the side where the distribution includes the fine portion matches a corrected value of a corresponding peak level ~~corresponding to the value of the reference level.~~

9. *(Currently Amended)*: ~~An information reproducing apparatus according to claim 1;~~ An information reproducing apparatus for performing maximum-likelihood decoding, comprising:

a detecting section which detects information recorded in the recording medium and which outputs a reproduction signal;

an equalizing section which performs partial response equalization of the reproduction signal and which outputs an equalized signal;

a correcting section which corrects the potential of the equalized signal in accordance with a correction amount determined on the basis of a plurality of reference levels used for the maximum-likelihood decoding, to produce a corrected equalizing signal; and

a maximum-likelihood decoding section which performs maximum-likelihood decoding of the corrected equalizing signal by referencing the plurality of reference levels, and which outputs a decoded signal;

wherein ~~when~~ representing the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding ~~are represented~~ by LV(1), LV(2), ..., LV(n-1), and LV(n) in sequence from the ~~lower~~ lowest level and ~~when~~ representing a plurality of ~~peak~~ levels for peaks in a histogram of equalized signals and that correspond to the reference levels ~~and that are output from the equalizing section are represented~~ by LP(1), LP(2), ..., LP(n-1), and LP(n) in sequence from the peak level whose corrected value is ~~smaller~~ smallest, a value LVd ~~represented by each interval equal to the intervals~~ between the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding is used to perform ~~output~~ restriction ~~for~~ of the equalized signals signal values to signals in a range between $LP(1) - 1/2 \cdot LVd$ and $LP(n) + 1/2 \cdot LVd$.

10. *(Currently Amended)*: An information reproducing apparatus according to claim 1, wherein the correcting section performs correction by using a variable gain amplifier whose amplification factor can be changed ~~corresponding to~~ by an external signals signal.

11. *(Currently Amended)*: An information reproducing method for performing maximum-likelihood decoding ~~by reading out information recorded on a recording medium,~~ comprising:

detecting information recorded in ~~the~~ a recording medium and outputting a reproduction signal;

performing partial response equalization of ~~a detection signal detected by the reproduction signal detecting section~~ and outputting an equalized signal;

producing a corrected equalized signal by correcting the potential of the equalized signal in accordance with a correction amount determined on the basis of a plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding; and

performing the maximum-likelihood decoding of the corrected equalized signal by referencing the plurality of reference levels, ~~in accordance with the equalized signal corrected by the correcting section~~ and outputting a decoded signal.

wherein, the plurality of reference levels used for the maximum-likelihood decoding are represented by LV(1), LV(2), ..., LV(n-1), and LV(n) in sequence from the lowest level, and a plurality of levels for peaks in a histogram of equalized signals and that correspond to the reference levels are represented by LP(1), LP(2), ..., LP(n-1), and LP(n) in sequence

from the peak level whose value is smallest, the correction amount is determined by the correcting section to generate a value satisfying one of:

$$\text{LP}(1) = \text{LV}(1) - \alpha \text{ (where } \alpha \text{ is a constant), and}$$

$$\text{LP}(n) = \text{LV}(n) + \alpha, \text{ and}$$

wherein the constant α is the same as a value LVd equal to each of the intervals between the plurality of reference levels used for the maximum-likelihood decoding and, based on the correction amount, the correcting section corrects a corresponding equalized signal level.

12. -13. (*Cancelled*).

14. (*Currently Amended*): An information reproducing method according to claim 11, wherein the correction amount is a value determined such that at least one of the corrected values of the plurality of peak levels for peaks in the a histogram of the equalized signals that correspond to the reference levels matches at least one of the values of the plurality of reference levels that are used for the maximum-likelihood decoding.

15. (*Currently Amended*): An information reproducing method according to claim 11, wherein the correction amount is a value determined such that at least one of the corrected values of the plurality of peak levels for peaks in the a histogram of the equalized signals that correspond to left and right reference levels adjacent to a central reference level used for the maximum-likelihood decoding matches at least one of the values of the left and right reference levels adjacent to the central reference level of the plurality of reference levels that are used for the maximum-likelihood decoding.

16. (*Currently Amended*): An information reproducing method according to claim 11, wherein, when levels for peaks in a histogram of the equalized signals has an asymmetric have a distribution that is asymmetric including a fine portion and a coarse portion with respect to a peak level corresponding to a central reference level of the plurality of reference levels used for the maximum-likelihood decoding, such that the distribution has a fine portion and a coarse portion, the correction amount is a value ~~determined~~ such that, in of left and right reference levels adjacent to the central reference level of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding, a value of the reference level on the side

where the distribution includes the fine portion matches a corrected value of a corresponding peak level ~~corresponding to the value of the reference level~~.

17. *(Currently Amended)*: An information reproducing method according to claim 11, wherein the correction amount is a value determined such that, at least one of reference levels provided at second left and right ~~portions~~ displacements from a central reference level of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding matches at least one of the corrected values of a plurality of ~~peak levels~~ for peaks in a histogram of the equalized signals corresponding to the reference levels provided at the second left and right portions from the central reference level.

18. *(Currently Amended)*: An information reproducing method according to claim 11, wherein, when levels for peaks in a histogram of the equalized signals ~~has an~~ have a distribution that is asymmetric component distribution including a fine portion and a coarse portion with respect to a peak level corresponding to a central reference level the reference levels, including a fine portion and a coarse portion, the correction amount is a value determined such that, in reference levels provided in second left and right portions of the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding, a value of the reference level on the side where the distribution includes the fine portion matches a corrected value of a corresponding peak level ~~corresponding to the value of the reference level~~.

19. *(Currently Amended)*: ~~An information reproducing method according to claim 11,~~ An information reproducing method for performing maximum-likelihood decoding, comprising:

detecting information recorded in a recording medium and outputting a reproduction signal;

performing partial response equalization of the reproduction signal and outputting an equalized signal;

producing a corrected equalized signal by correcting the potential of the equalized signal in accordance with a correction amount determined on the basis of a plurality of reference levels used for the maximum-likelihood decoding; and

performing the maximum-likelihood decoding of the corrected equalized signal by referencing the plurality of reference levels and outputting a decoded signal,

wherein ~~when~~ representing the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding ~~are represented~~ by LV(1), LV(2), ..., LV(n-1), and LV(n) in sequence from the ~~lower~~ lowest level and ~~when~~ representing a plurality of ~~peak~~ levels ~~for peaks~~ in a histogram of equalized signals and that correspond to the reference levels ~~and that are output from the equalizing section are represented~~ by LP(1), LP(2), ..., LP(n-1), and LP(n) in sequence from the peak level whose corrected value is ~~smaller~~ smallest, a value LVd ~~represented by each interval equal to the intervals~~ between the plurality of reference levels ~~that are~~ used for the maximum-likelihood decoding is used to perform ~~output restriction for~~ of the equalized signals signal values to signals in a range between $LP(1) - 1/2 \cdot LVd$ and $LP(n) + 1/2 \cdot LVd$.

20. *(Currently Amended)*: An information reproducing method according to claim 11, wherein the correction of the equalized signals is performed by using a variable gain amplifier whose amplification factor can be changed ~~corresponding to~~ by an external signals signal.